The Digital Library Landscape

Looking for Trends

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Cornell University

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Primary Information

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Underlying Trends

Every year sees an increase in the proportion of important information that is available with open access.

Every year sees an increase in the proportion of important information that is available online.

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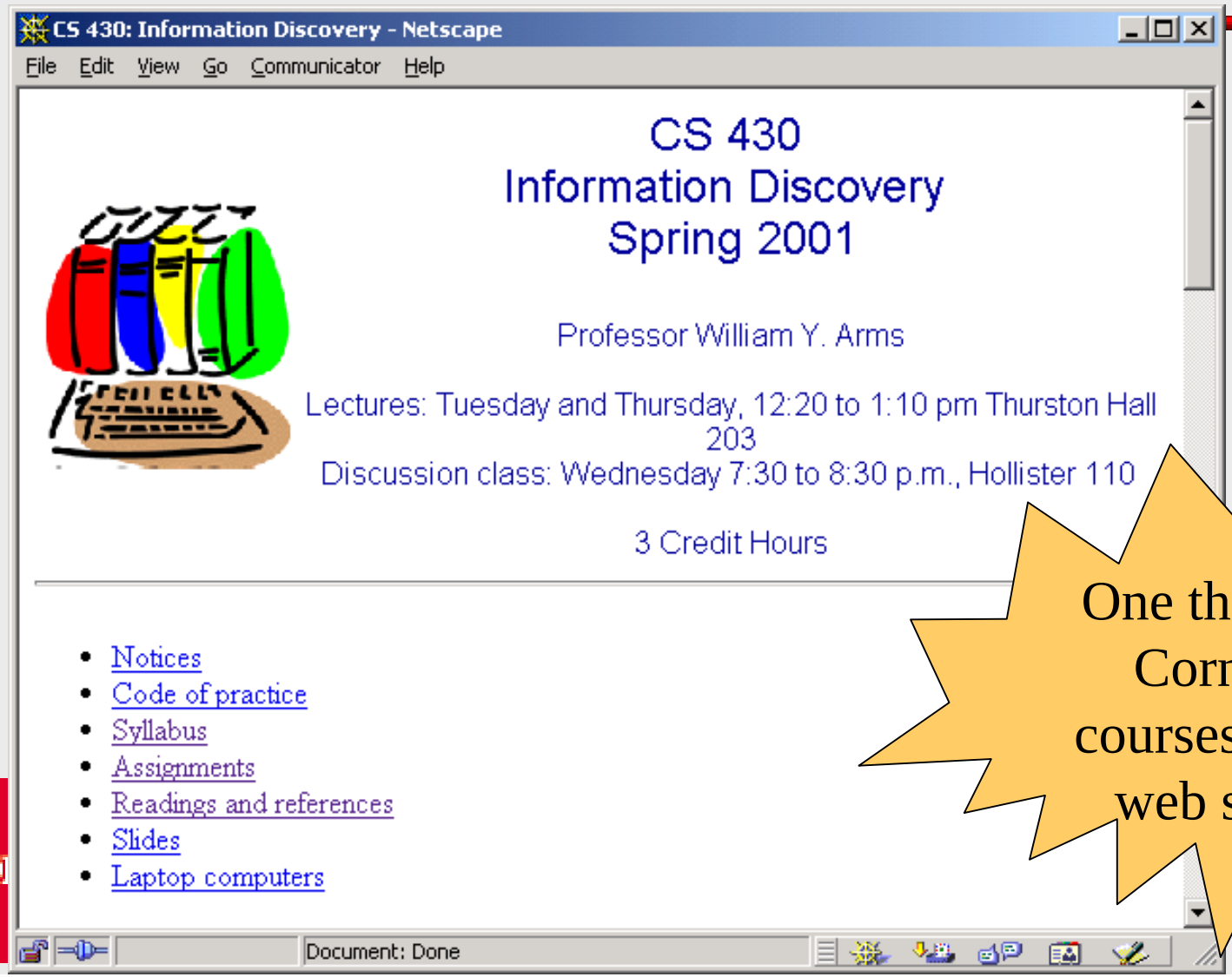
Course Web Sites



One third of Cornell courses have web sites

MIT News

MIT to make nearly all course materials available free on the World Wide Web

Unprecedented step challenges 'privatization of knowledge'

CAMBRIDGE, Mass. -- MIT President Charles M. Vest has announced that the Massachusetts Institute of Technology will make the materials for nearly all its courses freely available on the Internet over the next ten years. He made the announcement about the new program, known as MIT OpenCourseWare (MITOCW), at a press conference at MIT on Wednesday, April 4th.

MIT Press Release, April 4, 2001

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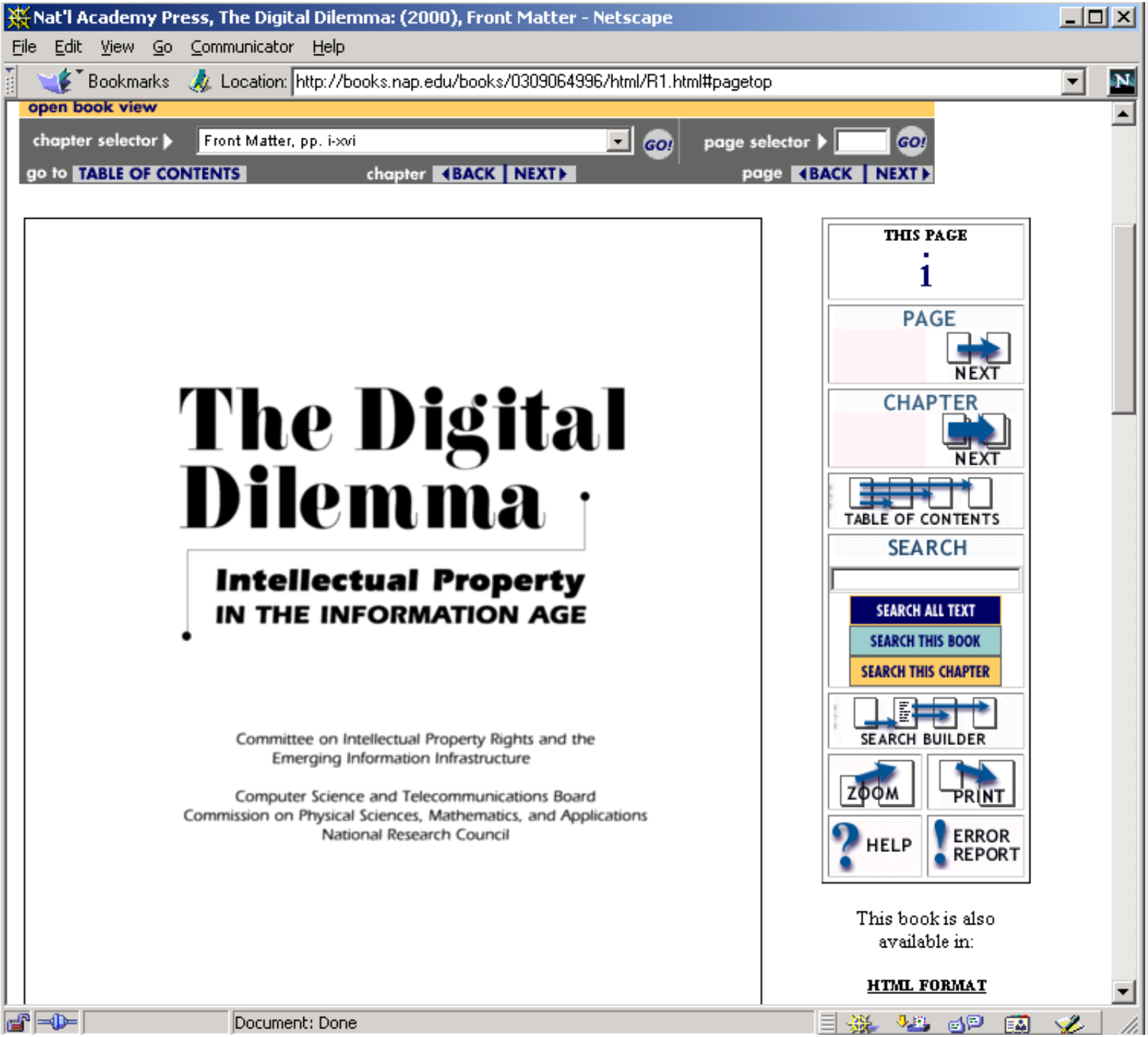
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Emerging Information Infrastructure
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The Making of a Suspect: The Case of Wen Ho Lee

By MATTHEW PURDY
FROM SUNDAY'S TIMES
A re-examination of the case against Los Alamos scientist Wen Ho Lee indicates that investigators took ambiguous evidence about Dr. Lee's behavior and Chinese atomic espionage and wove it into a case that eventually collapsed. The first of a two-part series. Go to Article

▪ DIAGRAM: Building a Smaller H-Bomb

U.S. Tries Defusing Allies' Opposition to Missile Defense

By MICHAEL R. GORDON
FROM SUNDAY'S TIMES
Defense Secretary Donald H. Rumsfeld, the first senior Bush administration official to visit Europe, tried today to defuse opposition to the administration's antimissile plans by offering to help European nations and other allies to deploy missile defenses.

(NYT)
After a five-year investigation, Dr. Wen Ho Lee, pictured here in December, was all but threatened with execution for not admitting spying. But prosecutors were never able to connect him to espionage. Go to Article

NATIONAL

Field Guide? Check. Binoculars? Check. Lobbyists? Soon. (12:00 a.m.)

INTERNATIONAL

Flames Consume the Dead, but Not the Anguish of India (12:00 a.m.)

INSIDE More

TRAVEL

Spring-Summe Cruise Special

Tahiti, Antigua, Murmansk.
Cruise ships set sail for distant ports. Also in Travel: Deal of the Day.

ABUZZ

Stocking the Shelves?

CLG815 asks: What are the twenty most essential items to have in the pantry? Add your suggestions.

discuss
ask
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MARKETS At Clos

Dow	10864.10	-119.53
Nasdaq	2660.50	-122.29
S&P 500	1349.47	-24.00
Russell 2000	501.50	-7.44

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D-Lib Magazine

ISSN: 1082-9873

Vol. 7 No. 1

January 2001

EDITORIAL

BOOK REVIEW

"...This book about cataloging certainly deserves to be read outside the community whose principles and traditions it describes and illuminates."

Implements Used on the Farm: Threshing Machine (Northern Great Plains) - Netscape

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Northern Great Plains, 1880-1920

Search on: Threshing | Threshing Machines | Threshing Crews

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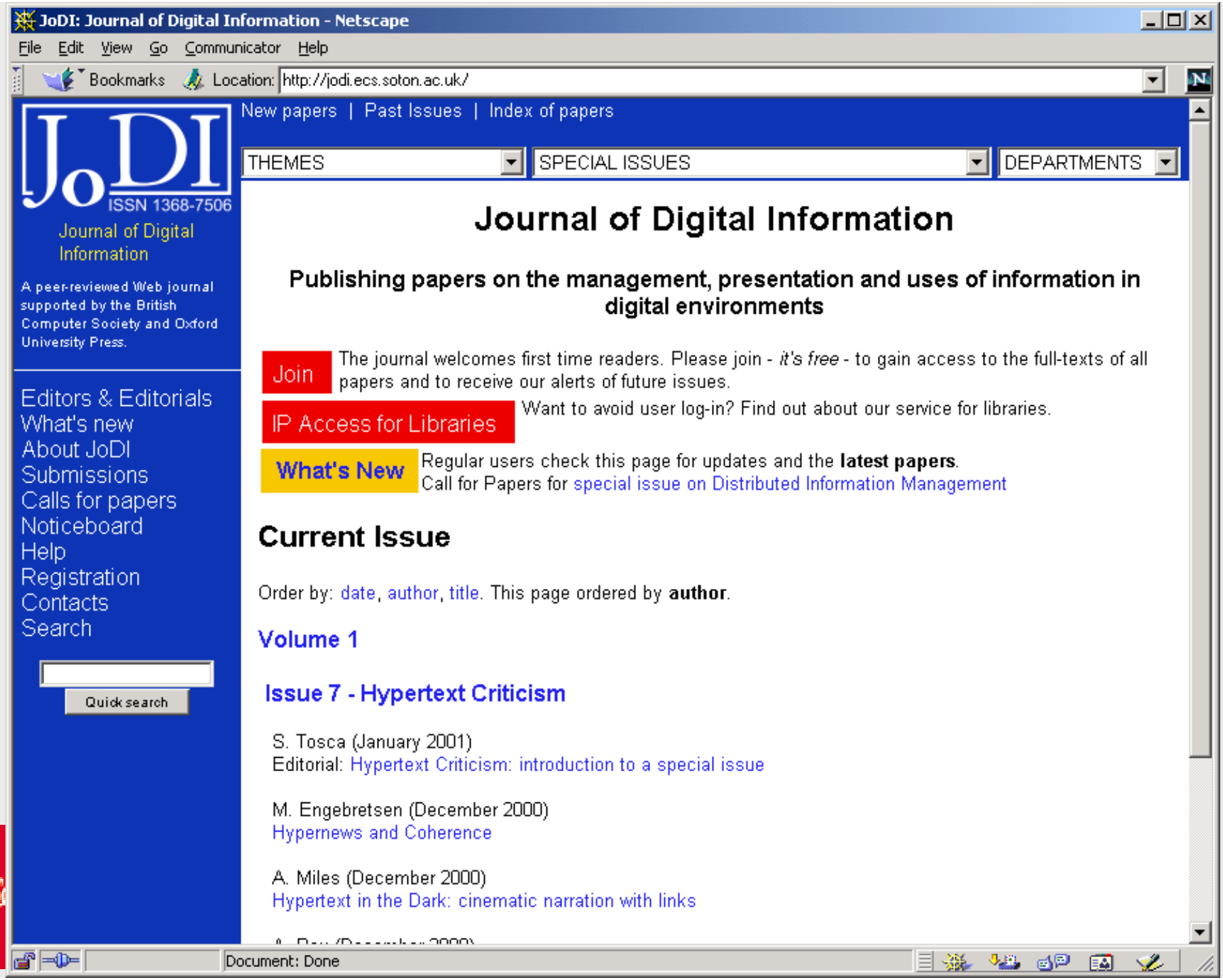
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Volume 1
Issue 7 - Hypertext Criticism
S. Tosca (January 2001)
Editorial: Hypertext Criticism: introduction to a special issue
M. Engebretsen (December 2000)
Hypernews and Coherence
A. Miles (December 2000)
Hypertext in the Dark: cinematic narration with links
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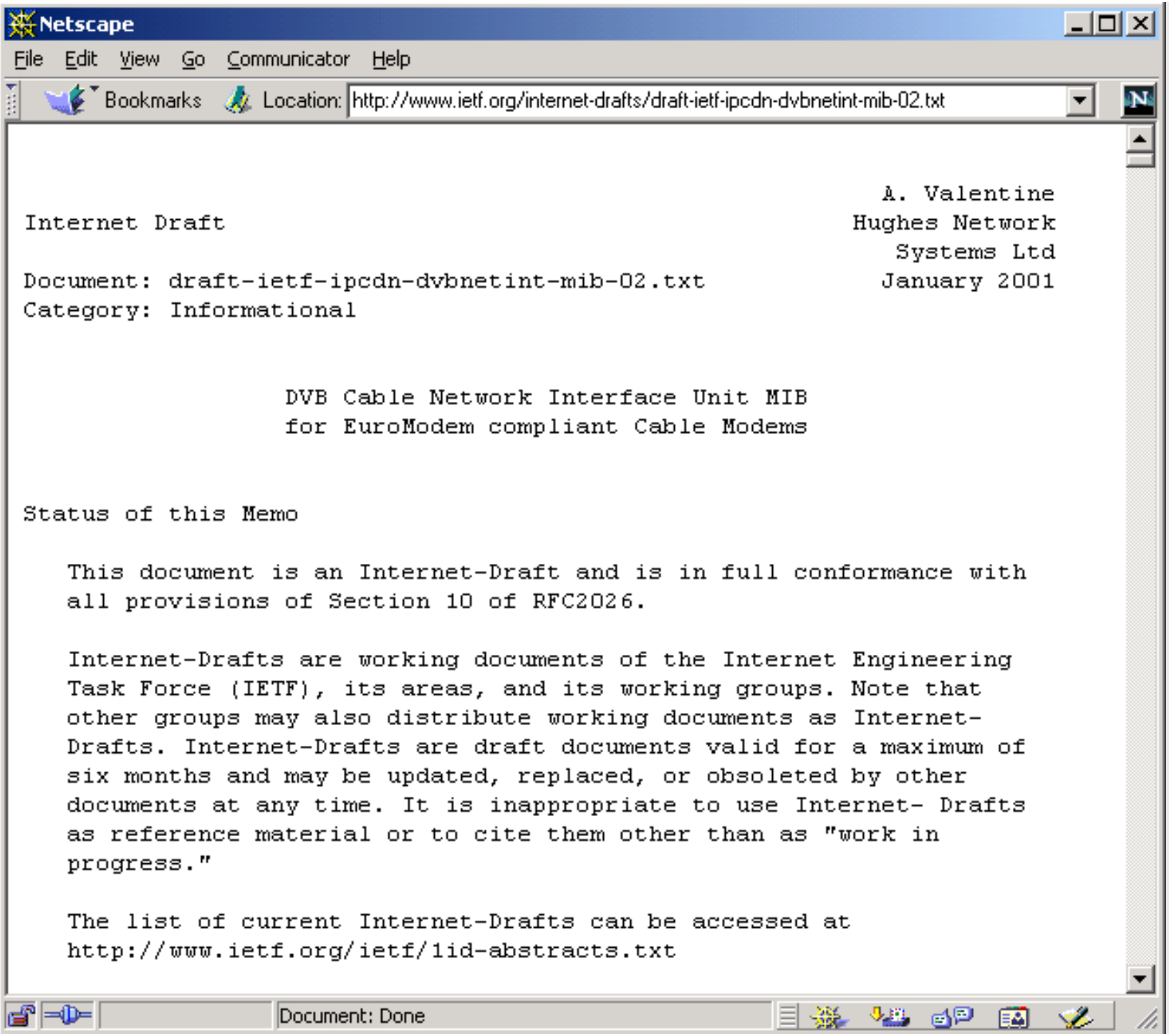
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Public Library of Science

Open Letter

We support the establishment of an online public library that would provide the full contents of the published record of research and scholarly discourse in medicine and the life sciences in a freely accessible, fully searchable, interlinked form. Establishment of this public library would vastly increase the accessibility and utility of the scientific literature, enhance scientific productivity, and catalyze integration of the disparate communities of knowledge and ideas in biomedical sciences.

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Secondary Information

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Information Discovery

"I used to be a heavy user of Inspec. Now I use Google instead."

Why are web search services the most widely used information discovery tools in universities today?

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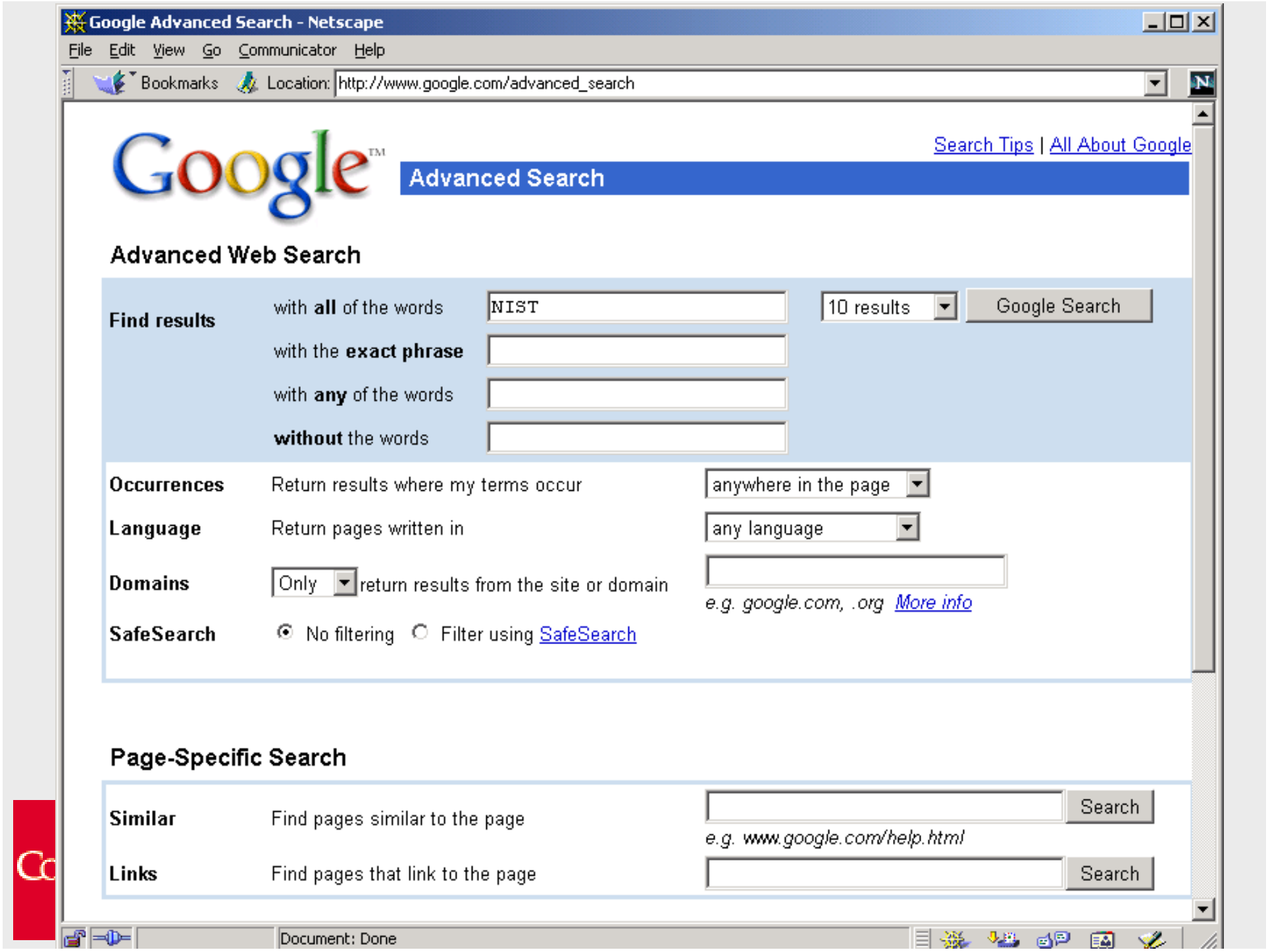
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All That You Can't Leave Behind

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Editorial Reviews

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These days we seem to be creating information faster than we can store it, but the near future is looking bright. Cornell professor William Y. Arms offers a program for that future in *Digital Libraries*, a synthesis of library and computer sciences that presents the history and current developments in each field with special emphasis on their interactions.

Since the book necessarily must appeal to a broad spectrum of professionals, any given reader will find some parts elementary, but Arms clearly maps the common ground and much of the text will appeal to all. Chapters covering the basics of information management, the Internet, security, archives, and retrieval bridge the traditional books-and-shelves library systems and the often jury-rigged information architecture developed over 40 years of computer use.

Digital Libraries contains plenty of sidebars detailing historical information as well as definitions primarily suited to professionals entering the interdisciplinary zone (but which would unacceptably break up the text flow; while it's important to understand both MARC codes and TCP/IP protocols, it's best for each reader to decide what supplementary information is needed). *Digital Libraries* is an ambitious and important book--if we are to develop truly efficient and accessible information management systems, everyone concerned must understand their shared technical history and move forward as one. --*Rob Lightner*

Was this content helpful to you? YES NO

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Mar 15 '01	**Kealakekua Bay - Snorkeling at it's Finest**	Kealakekua Bay State Historical Park in Parks	★★★★★	Very Helpful

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Before You Ask ...

- The open access information is sometimes a poor substitute
- Much good information is not available with open access

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Economics

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The Dilemma

It is hard to compete with a free good.

Library budgets and publishers' revenues are vulnerable.

Yet money is needed to pay for professional staff.

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Four Economic Models

Example: Broadcast Television

Open Access

Advertising	network television
External funding	public broadcasting

Restricted Access

Subscription	cable
Pay-by-use	pay-per-view

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Examples

Old	New
Books in Print (*subscription*)	Amazon.com (*advertising*)
Medline (*pay-by-use*)	Grateful Med (*external*)
Journal (*subscription*)	ePrint archives (*external*)
Westlaw (*pay-by-use*)	Legal Information Institute (*external*)
Inspec (*subscription*)	Google (*advertising*)

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A False Assumption

Incorrect thinking

The only incentive for creating information is to make money -- royalties to authors and profits for publishers

Correct thinking

Many creators do not require revenue

- Marketing and promotion
- Government information
- Academic research

They want their materials to be used

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Scholarly Information

The dominant force is **author pressure**, which emphasizes **open access** rather than closed access.

1. A mixture of economic models will coexist.

2. Eventually, we will have open access to most scientific, government and professional information.

3. The most common economic model will be that information is published by the producing organization.

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The Cost of Libraries and Publishing

The costs of libraries and publishing are dominated by personnel.

Major reductions in unit costs require different use of personnel.

By creative use of technology, can we build libraries that are of high quality at much lower costs?

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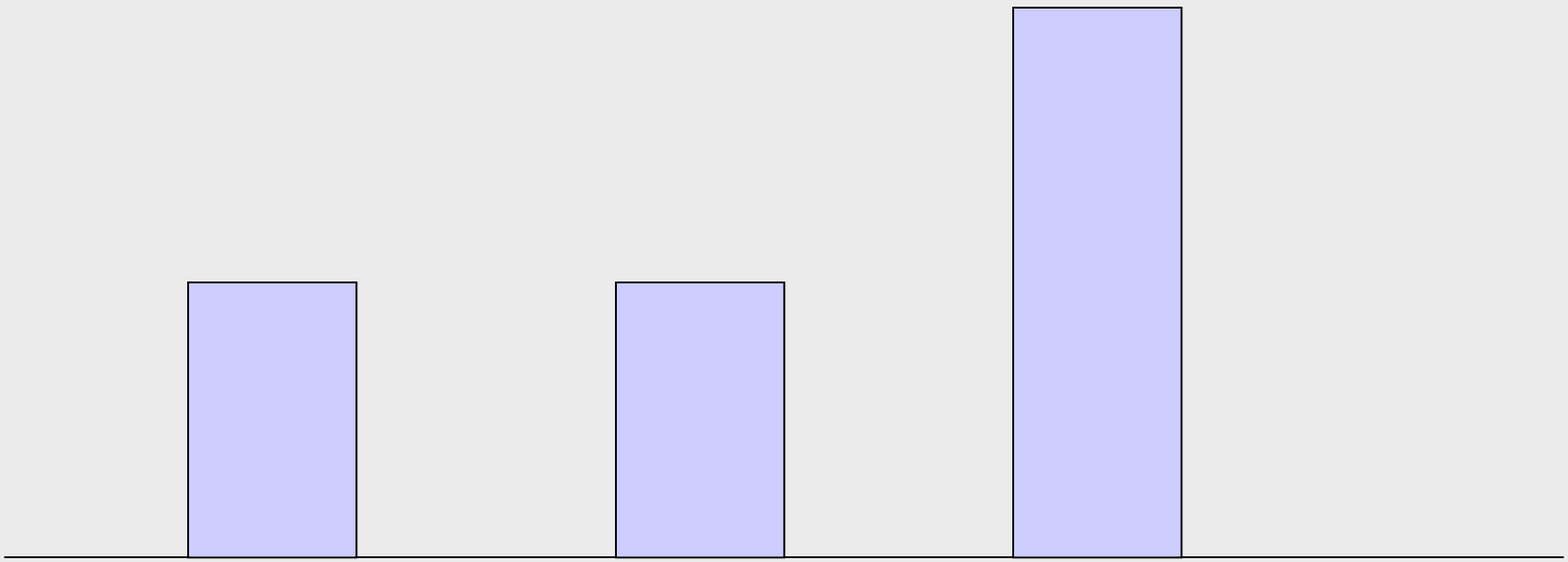
Research Libraries are Expensive



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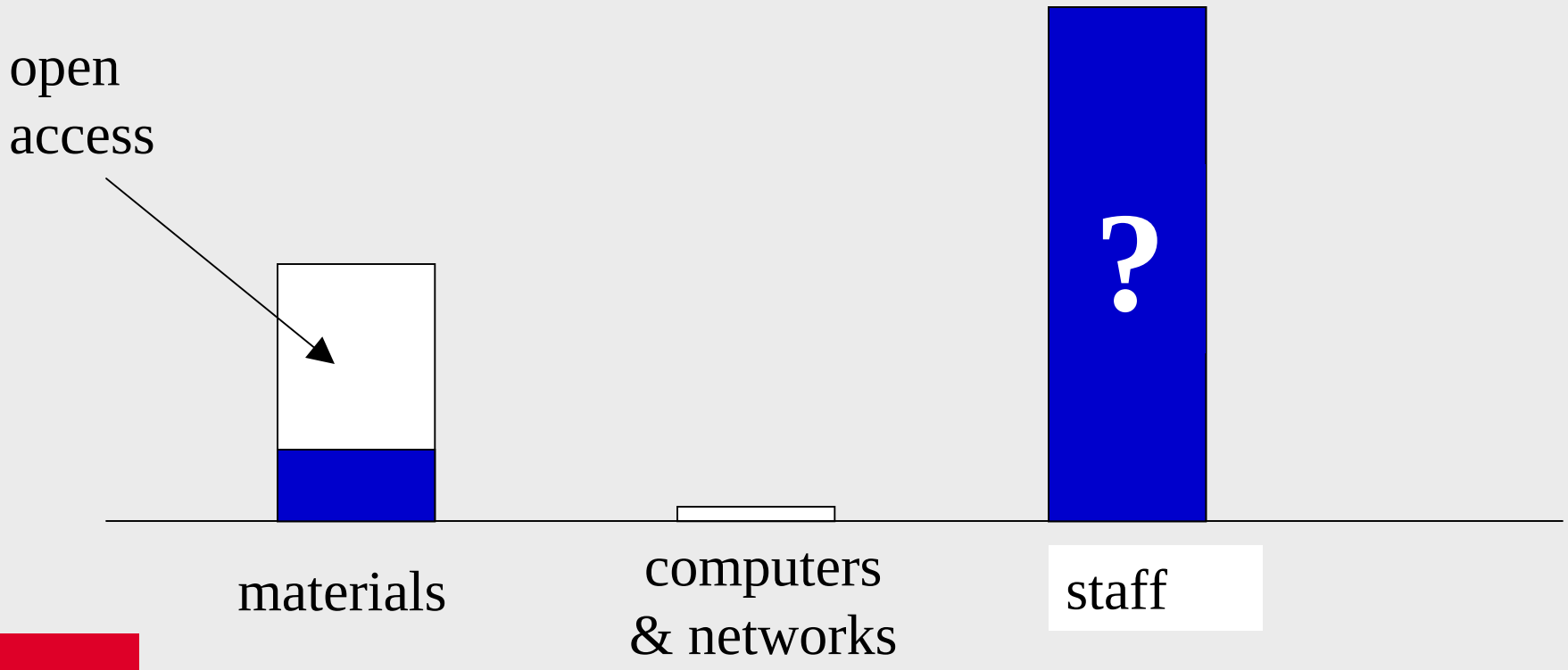
The Potential of Digital Libraries



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Dramatic Reductions in Cost

Thought experiment: *How would you reduce the cost of scientific, legal, medical and government information to one fifth?*

The only possible answer: *Automate labor intensive tasks.*

Moore's Law is the only hope.

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Brute Force Computing

Few people really understand Moore's Law

-- Computing power doubles every 18 months

-- Increases 100 times in 10 years

-- Increases 10,000 times in 20 years

Simple algorithms + immense computing power may outperform human intelligence.

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Automated Digital Libraries: Examples

Automatic indexing	Lycos, Infoseek, Altavista, Google, ...
Query matching	Vector methods (Salton)
Ranking importance	Google (Page and Brin)
Archiving	Internet Archive (Kahle)
Collection development	ResearchIndex (Lawrence)
Metadata extraction	Informedia (Wactlar)

Example: Catalogs and Indexes

Catalog, index and abstracting records are very expensive when created by skilled professionals, *but* ...

For information discovery, particularly with untrained users:

automated indexing of full text

is at least as effective as

manually produced indexes and catalogs

[Demonstrated repeatedly in experiments going back to the original Cranfield experiments.]

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The National Science Library (NSDL)

Can we build a very low cost national science library -- initially for education -- using the methods of automated digital libraries?

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Site for science

One of Six Core Integration Demonstration Projects for the NSDL

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How Big might the NSDL be?

The NSDL aims to be comprehensive -- all branches of science, all levels of education, very broadly defined.

Five year targets:

1,000,000	different users
10,000,000	digital objects
100,000	independent sites

Requires: **low-cost, scalable, technology**
automated collection building and maintenance

Site for science

The Spectrum of Interoperability: Federation

Standardization on sophisticated protocols, formats, metadata, authentication, etc.

Examples:

Library catalogs with MARC and Z 39.50

DLESE (NSDL)

smete.org (NSDL)

- High-quality interoperability of services
- High cost of entry to participating sites

<u>Smallish numbers of tightly integrated partners</u>

Has difficulty scaling

Site for science

The Spectrum of Interoperability: Metadata Harvesting

Agreements on simple protocol and metadata standard(s)

Example:

Metadata harvesting protocol of
the Open Archives Initiative (MHP)

- Moderate-quality services
- Low cost of entry to participating sites

Moderately large numbers of loosely collaborating sites

Promising but still an emerging approach

The Spectrum of Interoperability: Gathering

Robots gather collections automatically with no participation from individual sites

Examples:

Web search services (e.g., Google)

CiteSeer (a.k.a. ResearchIndex)

- Restricted but useful services
- Zero cost of entry to gathered sites

Very large numbers of independent sites

Only suitable for open access collections

Federal Agencies

How can the federal agencies help?

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As a Supplier of Information

Primary information

- Online, preferably with open access
- Support the interoperability spectrum, (e.g., the Metadata Harvesting Protocol of the Open Archives Initiative)

Secondary information

- Online, preferably with open access

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The Open Access Web

Before the web

- Few people had access to scientific, medical, government and legal information

With the web

- Much high quality information is available with open access
- Low cost services can organize this information and provide open access to it

"Please can I use the web? I don't do libraries."
Anonymous Cornell student, circa 1996.

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Some Light Reading

William Y. Arms, "Automated digital libraries." *D-Lib Magazine*, July/August 2000.
http://www.dlib.org/dlib/july20/07contents.html

William Y. Arms, "Economic models for open-access publishing." *iMP*, March 2000.
http://www.cisp.org/imp/march_2000/03_00arms.htm

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